



ELSEVIER
SAUNDERS

Anesthesiology Clin N Am
23 (2005) 863–885

ANESTHESIOLOGY
CLINICS OF
NORTH AMERICA

Cumulative Index 2005

Note: Page numbers of article titles are in **boldface** type.

A

Ablation, tissue, multilevel radiofrequency, for treatment of obstructive sleep apnea, 531

Acetaminophen, as adjuvants to intravenous patient-controlled analgesia, 113 for postoperative pain in children, 165–166 in multimodal approach to postoperative pain management, 188–189 nitric oxide-releasing derivatives of, 191

Acupuncture, in the preoperative period, impact on child's anxiety, 605–606

Acute lung injury, transfusion-related, 247

Acute normovolemic hemodilution, **271–281** benefits of, 277 cost effectiveness of, 278 efficacy of, 277–278 future of, 278 in cardiac surgery, 340 in elective orthopedic surgery, 308 in pediatric patients, 350–353 physiologic consequences, 273–274 practical considerations for, 275–277 technique, 271–273

Acute pain nurses, 216–221

Acute pain service, **211–225** audits and continuous quality improvement of, 221 cost-effectiveness of, 215–216 impact on outcome, 215 implementation of, 216–221 education, 219–220 role of surgeon in, 219 specialist pain nurse-based, 220–221 upgrading role of ward nurses in, 217–218 prevalence of, 212–213 structure and function of, 213–214

Adenotonsillectomy, in children, for obstructive sleep apnea treatment, 539–540

Adjuncts, analgesic, for postoperative pain management, **85–107** alpha-2 agonists, 90–93 dexmedetomidine, 91, 94 neuraxial clonidine, 91 peripheral nerve blocks with clonidine, 91 systemic clonidine, 90–91 anticonvulsants, 94–95 corticosteroids, 98 epidural administration of, 131 in children, 178–180 alpha-2-agonists, 179 epinephrine, 178 ketamine, 179–180 neostigmine, 180 neuraxial opioids, 179 sodium bicarbonate, 179 tramadol, 180

N-methyl-D-aspartate (NMDA) antagonists, 85–90 amantadine, 90 dextromethorphan, 88–89 ketamine, 86–88 magnesium, 89 neostigmine, 96–98 opioid antagonists, 95–96

Adjustable gastric banding, laparoscopic, management of obesity with, 509–511

Administration, of blood, errors in, in transfusion medicine, 257–258

Adolescents, ethical issues in pediatric palliative care, 851 obese, bariatric surgery in, 756–757

Advance care planning, in pediatric palliative care, 849–850

Age, as risk factor for obstructive sleep apnea, 412–413

Air embolism, complication of red cell recovery and reinfusion, 290

Airway anatomy, in children, pathophysiology of obstructive sleep apnea and, 536

Airway assessment, preoperative, in obese patients, 465–466

Airway complications, after pediatric lung transplantation, 725

Airway injury, avoidance of, during single-lung ventilation for pediatric anesthesia, 704

Airway, difficult, rapid sequence induction and, in patients with obesity and/or obstructive sleep apnea, 552–555

Alcohol consumption, as risk factor for obstructive sleep apnea, 414–415

Alfentanil, in pediatric anesthesia, 628

Allogeneic blood transfusion, in cardiac surgery patients, clinical outcomes in, 334–339

Alpha-2 adrenergic agonists, pediatric acute pain management with, 798

Alpha-2 agonists, as adjunct for postoperative pain in children, 179
as analgesic adjunct in postoperative pain management, 90–93
in multimodal approach, 192–193

Amantadine, as analgesic adjunct in postoperative pain management, 90

Anemia, in surgical patients, clinical outcomes of, 315–325
efficacy of transfusion, 319–322
human data, 318–319
interaction between pathophysiological processes and, 317–318
pathophysiology, 315–317
transfusion threshold, 322–323

Anesthesia, in obese patients, 479–486
intensity of monitoring required for, 483
laparoscopy in, 484
minimizing hypoxia during anesthesia, 484–486
pharmacokinetics, 479–481
positioning obese patients for surgery, 481–482
regional anesthesia in, 482–483
in patients with obstructive sleep apnea, in children, 542–544
effects of anesthetic drugs on ventilation responses in, 486–487
intensity of intraoperative monitoring required, 487
rational approach to, 488
technique, 487

pediatric, blood conservation in, 347–361
acute normovolemic hemodilution, 350–353
deliberate hypotension, 354
human recombinant erythropoietin, preoperative administration of, 354–356
intraoperative blood salvage, 353
multimodal strategies for, 356–357
preoperative autologous donation, 349–350
transfusion triggers and institutional algorithms, 348–349

pediatric. *See Pediatric anesthesia.*

rapid sequence induction in patients with obesity and/or obstructive sleep apnea, 551–564
cricoid pressure, 556–560
induction agent pharmacology, 560–561
risk of gastroesophageal reflux and pulmonary aspiration, 555–556
with the difficult airway, 552–555

Anesthesia ventilators. *See Ventilatory support, mechanical.*

Anesthetic agents, new developments in pediatric cardiac anesthesia, 655–658
local. *See Local anesthetics.*

Anticoagulant, in red cell recovery and reinfusion, 286–287

Anticonvulsants, as analgesic adjuncts in postoperative pain management, 94–95

Antiemetics, as adjuvants to intravenous patient-controlled analgesia, 113–114

Antifibrinolytic agents, in pediatric cardiac anesthesia, 658–659, 659–660

Antispasmodics, pediatric acute pain management with, 799–800

Anxiety, preoperative, in children, psychological preparation for, 597–614
risk factors for development of, 598–599
treatment of, 599–606
acupuncture, 605–606
behavioral intervention, 606
music, 604–605
outcomes of, 606–609
parental presence during induction of anesthesia, 601–604
preoperative preparation programs, 599–601

Apnea-hypopnea index, 407, 446–447

Apnea. See also *Obstructive sleep apnea*.
definition of, 406–407

Arndt endobronchial blockers, for single-lung ventilation in pediatric anesthesia, 698–700

Arrhythmias, after pediatric lung transplantation, 726

Artificial oxygen carriers, current status of, 373–389

- hemoglobin solutions, 375–382
- diaspirin cross-linked hemoglobin, 376–378
- hemoglobin raffimer, 380–381
- human polymerized hemoglobin, 379–380
- human recombinant hemoglobin, 378
- maleimide-activated polyethylene glycol-modified hemoglobin, 381–382
- polymerized bovine hemoglobin-based, 378–379
- nano-dimension artificial red blood cells, 384
- outlook for, 384–385
- perfluorocarbon (PFC) emulsions, 382–384
- perflubron emulsion (Oxygent), 382–384

Aspiration, pulmonary, risk of, in anesthesia of patients with obesity and/or obstructive sleep apnea, 555–556

Assessment, preoperative.
See *Preoperative evaluation*.

Atherosclerotic cardiovascular disease, associated with obstructive sleep apnea, 439

Autologous blood donation

- acute normovolemic hemodilution, 271–281, 308
- benefits of, 277
- cost effectiveness of, 278
- efficacy of, 277–278
- future of, 278
- physiologic consequences, 273–274
- practical considerations for, 275–277
- technique, 271–273

for elective orthopedic surgery, perioperative assessment of patient, 295–303

- preoperative evaluation and methods to reduce blood use, 305–313

preoperative, 263–270

- aggressive phlebotomy in, 266–267
- cost effectiveness, 268
- erythropoietin use in, 266–267
- in pediatric patients, 349–350
- patient selection for, 264–266
- preoperative collection of components, 267–268
- transfusion trigger in, 267
- red blood cell recovery and reinfusion, 283–294, 308–309

Axillary block, in children, 822–824

Axillary brachial plexus block, for postoperative pain, 145–146

B

B19 parvovirus infection, transfusion-transmitted, 245

Baby Doe, ethical issues in pediatric palliative care, 850

Bacterial contamination, transfusion-transmitted infection due to, 244

Balloon-tipped bronchial blockers, for single-lung ventilation in pediatric anesthesia, 697

Banding, gastric, laparoscopic adjustable, management of obesity with, 509–511

Barbiturates, for procedural sedation in pediatric patients, 645, 648

Bariatric surgery, 504–520

- choice of surgery, 518–519
- complications, 517–518
- future developments, 517
- in obese adolescents, 756–757
- indications for, 505
- malabsorptive procedures, 514–516
 - biliopancreatic diversion, 514–516
 - duodenal switch, 514–516
- overview of surgical procedures, 506–508
- preoperative preparation, 505
- restrictive procedures, 508–514
 - laparoscopic adjustable gastric banding, 509–511
 - roux-en-Y gastric bypass, 511–514
 - vertical gastric banding, 508–509
 - simultaneous cholecystectomy with, 519

Barriers, to health care, in pediatric palliative care, 851–853

Behavioral consequences, of inadequate postoperative pain relief, 23–24

Behavioral interventions, in the preoperative period, impact on child's anxiety, 605–606

Behavioral modification, in obesity management, 502
in obstructive sleep apnea management, 527

Benzodiazepines, for procedural sedation in pediatric patients, 645

Biliopancreatic diversion, surgical management of obesity with, 514-516

Biology, of obesity and obstructive sleep apnea, 445-461
definitions, thresholds, and methodology, 446-447
familial relationships in, 447-449
mechanisms linking genetic variability in, 451-453
obesity and, 449-451
other inherited phenotypes predisposing to, 453-457
abnormalities in sleep regulation, 456-457
alterations in ventilation control, 455-456
craniofacial morphology, 453-455
specific genes and genetic markers associated with, 449

Bleeding, new developments in pediatric cardiac anesthesia, 658-659
perioperative, in cardiac surgery, 327-329

Blood conservation, in cardiac surgery, 327-345
in critically ill patients, 363-372
in orthopedic surgery, 305-313
in pediatric anesthesia, 347-361
with artificial oxygen carriers, 373-389

Blood donation, autologous, 263-270
acute normovolemic hemodilution, 271-281
aggressive phlebotomy in, 266-267
cost effectiveness, 268
erythropoietin use in, 266-267
patient selection for, 264-266
preoperative collection of components, 267-268
transfusion trigger in, 267

Blood loss, during cell salvage, calculation of, 288

Blood transfusions. See also *Transfusion medicine*.
risks of, 241-252
acute lung injury related to, 247
emerging risks, 248
errors in, 247-248, 253-261
immunosuppression, 246-247
infections, 241-246

Bone healing, effects of cyclooxygenase-2 inhibitors for postoperative pain management, 61-62

Bovine hemoglobin-based oxygen carrier, polymerized, 378-379

Brachial plexus blocks, for postoperative pain, 141-146
axillary, 145-146
in children, 822-824
infraclavicular, 144-145
interscalene, 141-143
suprACLavicular, 143-144

Bronchial blockers, balloon-tipped, for single-lung ventilation in pediatric anesthesia, 697

Bronchiolitis obliterans, after pediatric lung transplantation, 724-725

Bupivacaine, for postoperative pain in children, 176-177

C

Cancer, risks of in obesity, 427

Cardiac anesthesia, pediatric, new developments in, 655-676
anesthetic agents, 655-658
bleeding and coagulation, 658-662
mechanical circulatory support, 666-667
neurological monitoring, 662-666
short-term support, 667-672

Cardiac surgery, conventional versus bloodless, 327-345
blood conservation methods in, 339-341
clinical outcomes, factors influencing, 334-339
coronary artery bypass graft techniques and, 330
laboratory coagulation tests, 330-331
predictors of transfusion requirements for, 332-334
variability in transfusion practice for, 331-332

Cardiorenal effects, of cyclooxygenase-2 inhibitors for postoperative pain management, 61-62

Cardiovascular disease, associated with obstructive sleep apnea, 439
risk in patients with obstructive sleep apnea, preoperative evaluation of, 473

Cardiovascular pathophysiology, in obesity, 422

Cardiovascular system, preoperative assessment in obese patients, 467–469

Catheter techniques, for delivery of local anesthetics for postoperative pain management, 76–77

Catheters, Fogarty embolectomy, for single-lung ventilation in pediatric anesthesia, 697–698

Caudal analgesia, for pediatric acute pain management, 807
in children, 170–175
continuous, 173–174
high blocks, 172–173
single-shot, 171–172

Caudal anesthesia, in children, 824–827

Celecoxib, efficacy in postoperative pain management, 53–54

Cell salvage, red blood cell recovery and reinfusion, 283–294
comparison with other techniques, 290–292
cell salvage, 292
normovolemic hemodilution, 291–292
preoperative autologous donation, 291
complications, 290
air embolism, 290
wrong wash solution, 290
in elective orthopedic surgery, 308–309
in pediatric patients, 353
optimizing red cell return, anticoagulant, 287
calculation of blood loss during cell salvage, 288
collection reservoir, 287–288
optimizing red cell return, 285–288
rinsing of surgical sponges, 286
suction, 285–286
wash quality, 289–290
physics of cell salvage machine, 283–285

Central sleep apnea, 407–408, 431

Centroneuraxis opioids, for pediatric acute pain management, 808

Cerebral palsy, surgery and anesthesia for children who have, 733–743
anesthetic management, 735–742
bleeding, intraoperative, 740–742
intraoperative, 735–736, 739
preoperative, 735
regional techniques, 739
temperature, 739–740

preoperative concerns, 734–735
gastrointestinal, 734
neurological, 734–735
respiratory, 734

Cerebrovascular disease, associated with obstructive sleep apnea, 439

Chest. *See Thoracic surgery.*

Children, anesthesia in.
See Pediatric anesthesia.
obesity in, 398–399
obstructive sleep apnea in, 535–549
clinical features, 537–538
complications, 538
evaluation, 539
pathophysiology, 535–537
airway anatomy, 536
neuromotor factors, 537
obesity and, 536–537
treatment, 539–547
intraoperative anesthesia plan, 542–544
monitoring, 544–545
pain management, 546
perioperative management, 540
postoperative care, 544
preanesthesia evaluation, 540–542
prognosis, 546–547
respiratory support, 545–546
surgery for, 540

postoperative pain management in, 163–184
epidural/caudal blocks, 170–175
intravenous patient/parent/nurse-controlled analgesia, 168–170
local anesthetics/adjuncts, 176–180
nonopioid analgesics, 165–168
potent opioid analgesics, 168

Chloral hydrate, for procedural sedation in pediatric patients, 645

Cholecystectomy.
Cholecystectomy, laparoscopic, procedure-specific postoperative pain management guidelines for, 207–209
performed simultaneously with bariatric surgery, 519

Chronic conditions, complex, palliative care in children with life-threatening, 837–856

Chronic opioid-consuming patients.
See Opioids.

Chronic pain, postoperative. *See Pain, postoperative, persistent.*

Clonidine, as analgesic adjunct in postoperative pain management, 90–93
 —neuraxial, 91
 —peripheral nerve blocks with, 91
 —systemic, 90–91

Coagulation, new developments in pediatric cardiac anesthesia, 658–659

Codeine, pediatric acute pain management with, 795–796

Collection reservoir, in red cell recovery and reinfusion, 286–287

- Collection, of blood, errors in, in transfusion medicine, 257–258

Communication, as part of pediatric palliative care, 843

Complex chronic conditions, palliative care in children with, 837–856

Congenital heart disease, pediatric cardiac anesthesia, new developments in, 655–676
 —anesthetic agents, 655–658
 —bleeding and coagulation, 658–662
 —mechanical circulatory support, 666–667
 —neurological monitoring, 662–666
 —short-term support, 667–672

Congestive heart failure, associated with obstructive sleep apnea, 440

Conservation, of blood, in cardiac surgery, 327–345
 —in critically ill patients, 363–372
 —in orthopedic surgery, 305–313
 —in pediatric anesthesia, 347–361
 —with artificial oxygen carriers, 373–389

Contamination, bacterial, transfusion-transmitted infection due to, 244

Continuous epidural analgesia, pediatric acute pain management with, 803–805

Continuous intravenous opioid infusion, pediatric acute pain management with, 803

Continuous positive airway pressure (CPAP), for treatment of obstructive sleep apnea, 525–526

Convalescence, postoperative, multimodal analgesia to shorten, 196

Coronary artery bypass graft surgery. See *Cardiac surgery*

Coronary artery disease, associated with obstructive sleep apnea, 439

Corticosteroids, as analgesic adjuncts in postoperative pain management, 98

Cost effectiveness, of autologous blood donation, 268
 —of acute normovolemic hemodilution, 278

Craniofacial abnormalities, inherited, predisposing to sleep apnea, 453–455

Creutzfeld-Jakob disease, transfusion-transmitted, 245–246

Cricoid pressure, rapid sequence induction and, in patients with obesity and/or obstructive sleep apnea, 555–560

Critically ill patients, blood conservation in, 363–372
 —red blood cell transfusions in, 363–66
 —efficacy and risks, 364–366

Cyclooxygenase-2 (COX-2) inhibitors, in postoperative pain management, contraindications, 63–64
 —drug interactions, 63
 —efficacy, 51–57
 —celecoxib, 53–54
 —parecoxib, 56–57
 —valdecoxib, 55–56
 —expression and function, 50–51
 —in children, 167
 —in multimodal approach, 189–191
 —safety and tolerability, 57–63
 —cardiorenal effects, 57–61
 —effects on bone and wound healing, 62–63
 —gastrointestinal toxicity, 57
 —hematologic effects, 57–58
 —hepatic effects, 61–62

Cytomegalovirus infection, transfusion-transmitted, 244–245

D

Death, developmental stages of children's understanding of, 839–842
 —palliative care in pediatrics, 837–856

Delivery techniques, novel, for local anesthetics in postoperative pain management, 75–77
 —catheter techniques, 76–77
 —encapsulated drugs, 75–76

Demographics, of obesity, 397–403
 —of obstructive sleep apnea, 405–420

Development, child, impact of complex chronic conditions on, 839–842

Developmental pharmacology, and opioids in pediatric anesthesia, 622–625

Dexmedetomidine, as analgesic adjunct in postoperative pain management, 91, 94
pediatric acute pain management with, 798

Dextromethorphan, as analgesic adjunct in postoperative pain management, 88–89
for postoperative pain in children, 167

Diabetes, associated with obstructive sleep apnea, 438–439

Diagnosis, of obesity, 397–403
of obstructive sleep apnea, 405–420
during preoperative evaluation, 470–472

Diaspirin cross-linked hemoglobin, as artificial oxygen carrier, 376–378

Diet, in obesity management, 502

Disordered breathing events, in obstructive sleep apnea, 406–408

Donation, blood. *See* Blood donation.

Double-lumen tubes, for single-lung ventilation in pediatric anesthesia, 701–703

Drug clearance, developmental pharmacology and opioids in pediatric anesthesia, 622–625

Drugs, for weight loss, in management of obesity, 502–504

Duodenal switch, surgical management of obesity with, 514–516

Dying, palliative care in pediatrics, 837–856

E

Echocardiography, in pediatric cardiac anesthesia, measurement of response, 657–658

Education, patient, in acute pain service, 219–220
on intravenous patient-controlled analgesia, 116–117

Elderly patients, intravenous patient-controlled analgesia in, 118–119

Elective surgery, orthopedic, perioperative assessment of patients, 295–303
preoperative evaluation and methods to reduce blood use in, 305–313

Electroencephalogram modalities, in pediatric cardiac anesthesia, 662–663

Embolectomy catheters, Fogarty, for single-lung ventilation in pediatric anesthesia, 697–698

Embolism, air, complication of red cell recovery and reinfusion, 290

Encapsulated drugs, for delivery of local anesthetics in postoperative pain management, 75–76

Endobronchial blockers, Arndt, for single-lung ventilation in pediatric anesthesia, 698–700

Endotracheal tubes, for single-lung ventilation in pediatric anesthesia, 697

Epidemiology, of life-threatening illness in children, palliative care and, 837–839
of obstructive sleep apnea, 494

Epidural analgesia, for postoperative pain, 125–140
benefits and patient outcomes, 126–128
continuous infusion *versus* patient-controlled, 132
duration of, 131–132
factors affecting efficacy of, 129–132
in children, 170–175
continuous, 173–175
patient-controlled, 175–176
in chronic opioid-consuming patients, 39
risks of, 132–134
in multimodal approach to postoperative pain management, 187
pediatric acute pain management with, continuous, 803
patient-controlled, 805–806

Epidural hematoma, risk of, with epidural analgesia, 132–133

Epidural opioids, in pediatric anesthesia, 630–632, 828–830

Epinephrine, as adjunct for postoperative pain in children, 178

Epoetin alfa, reducing blood use in elective orthopedic surgery with, 309–311

Errors, medical, in transfusion medicine, 247–248, 253–261
prevention of, 258–259
types of, 255–258
UK Serious Hazards of Transfusion (SHOT) scheme, 254–255

Erythropoietin, blood conservation with, in autologous blood donation, 266–267
in cardiac surgery, 339–340
in elective orthopedic surgery, 309–311
in pediatric surgical patients, 354–356

Ethical issues, in pediatric palliative care, 849–851
 advance care planning, 849–850
 Baby Doe, 850
 in adolescents, 851

Ethnic differences, in obesity, 398, 401

Exercise, in obesity management, 502

F

Familial relationships, in sleep apnea, 447–449

Family history, as risk factor for obstructive sleep apnea, 414

Fascia iliaca compartment block, in children, 821

Femoral nerve block, for postoperative pain, 148–150
 in children, 819–821

Fenfluramine, 503

Fentanyl, in pediatric anesthesia, 626–627
 pediatric acute pain management with, 794–795

Fentanyl challenge, preoperative, in chronic opioid-consuming patients, 41

Fogarty embolectomy catheters, for single-lung ventilation in pediatric anesthesia, 697–698

G

Gabapentin, as analgesic adjunct in postoperative pain management, 92–93, 94–95
 in multimodal approach, 193

Gastric banding, laparoscopic adjustable, management of obesity with, 509–511

Gastric bypass, Roux-en-Y, surgical management of obesity with, 511–514
 complications following, 513
 essential components of, 512

Gastroesophageal reflux, risk of, in anesthesia of patients with obesity and/or obstructive sleep apnea, 555–556

Gastroesophageal reflux disease, associated with obstructive sleep apnea, 440
 preoperative evaluation of obese patients with, 469

Gastrointestinal complications, after pediatric lung transplantation, 725–726

Gastrointestinal toxicity, of cyclooxygenase-2 inhibitors for postoperative pain management, 57

Gender, as risk factor for obstructive sleep apnea, 412

Genetics, of malignant hyperthermia, 615–619
 of obesity and obstructive sleep apnea, 445–461
 definitions, thresholds, and methodology, 446–447
 familial relationships in, 447–449
 mechanisms linking genetic variability in, 451–453
 obesity and, 449–451
 other inherited phenotypes predisposing to, 453–457
 abnormalities in sleep regulation, 456–457
 alterations in ventilation control, 455–456
 craniofacial morphology, 453–455
 specific genes and genetic markers associated with, 449
 role in obesity, 399–400

Genioglossus advancement, for treatment of obstructive sleep apnea, 530–531

Glucocorticoids, in multimodal approach to postoperative pain management, 193

Grief, as part of pediatric palliative care, 843

Guidelines, procedure-specific, for postoperative pain management, 203–210
 example of, for laparoscopic cholecystectomy, 207–209

H

Heart disease, congenital, pediatric cardiac anesthesia, new developments in, 655–676
 anesthetic agents, 655–658
 bleeding and coagulation, 658–662
 mechanical circulatory support, 666–667
 neurological monitoring, 662–666
 short-term support, 667–672

Heart transplantation, pediatric, 709–715
 donor selection, 710–711
 immunosuppressive agents, 713
 indications, 709–710
 intraoperative management, 711–712
 outcome after, 713–715
 recipient evaluation, 710
 rejection, 715

Hematologic effects, of cyclooxygenase-2 inhibitors for postoperative pain management, 57–58

Hematoma, epidural, risk of, with epidural analgesia, 132–133

Hemodilution. See *Acute normovolemic hemodilution*.

Hemoglobin raffimer (Hemolink), 380–381

Hemoglobin-based artificial oxygen carriers, 375–382
diapsirin cross-linked, 376–378
hemoglobin raffimer, 380–381
human polymerized hemoglobin, 379–380
human recombinant hemoglobin, 378
maleimide-activated polyethylene glycol-modified hemoglobin, 381–382
polymerized bovine hemoglobin-based, 378–379

Hepatic drug clearance, developmental pharmacology and opioids in pediatric anesthesia, 622–625

Hepatic effects, of cyclooxygenase-2 inhibitors for postoperative pain management, 61–62

Hepatitis, transfusion-associated, 242–243

History, of pediatric anesthesia, 573–595
after World War II, 582–585
in the 1960s and 1970s, 585–587
in the 1980s and 1990s, 587–591
in the first half of the twentieth century, 578–582
in the nineteenth century, 575–578

History, family, as risk factor for obstructive sleep apnea, 414

Human immunodeficiency virus (HIV), transfusion-associated, 242–243

Human recombinant hemoglobin, as artificial oxygen carrier, 378

Human T-lymphotropic virus (HTLV)-1, transfusion-transmitted, 245

Hydrocodone, pediatric acute pain management with, 796

Hydromorphone, pediatric acute pain management with, 794

Hyperalgesia, sensitization and, 2

Hypertension, pulmonary, in patients with obstructive sleep apnea, preoperative evaluation of, 473
systemic, associated with obstructive sleep apnea, 438

Hyperthermia, malignant, genetics of, 615–619

Hypopnea. See also *Obstructive sleep apnea*.
definition of, 406–407
physiologic characteristics of, 431–433

Hypotension, deliberate, for blood conservation in pediatric surgical patients, 354

Hypoxemia, treating and avoiding during single-lung ventilation for pediatric anesthesia, 703–704

Hypoxia, during anesthesia, minimizing in obese patients, 484–486

I

Ilioinguinal-iliohypogastric nerve block, in children, 816–818

Immunosuppression, due to blood transfusions, 246–247

Immunosuppressive agents, for pediatric heart transplantation, 713

Incisional pain, mechanisms of, 1–20
clinical models of, 2–4
experimental versus clinical models of, 4
laparotomy models for, 4–5
plantar incision model for, 5–15
prevention strategies, 15–16
schematic for, 16–17

Induction agents, pharmacology of, and rapid sequence induction in patients with obesity and/or obstructive sleep apnea, 560–561

Infants, sensitivity to opioids in neonates, 624–625
spinal anesthesia for, 830–832
anatomy, 830–831
drug dosage in, 832
technique in ex-premature patients, 831

Infection, after pediatric lung transplantation, 726
due to blood transfusions, 241–246
bacterial contamination, 244
cytomegalovirus, 244–245
other agents, 245–246
B19 parvovirus, 245
Creutzfeld-Jakob disease, 245–246
human T-lymphotropic virus, 245
risk of, with epidural analgesia, 133
viral, 242–243

Infraclavicular brachial plexus block, for postoperative pain, 144–145

Interscalene brachial plexus block, for postoperative pain, 141–143

Intraoperative red blood cell retrieval and reinfusion. See *Cell salvage*.

Intravenous patient-controlled analgesia. See *Patient-controlled analgesia*.

J

Jaw advancement techniques, for treatment of obstructive sleep apnea, 530

K

Ketamine, as adjunct for postoperative pain in children, 179–180
as adjuvant to intravenous patient-controlled analgesia, 113
as analgesic adjunct in postoperative pain management, 86–88
role as adjunct to opioids, 86–88
as continuous bolus infusion, 87
as single intravenous bolus, 87–88
epidural, 88
in patient-controlled analgesia, 86–87
role in preventive analgesia, 86
pediatric acute pain management with, 797

L

Laboratory errors, in transfusion medicine, 257

Laparoscopic adjustable gastric banding, surgical management of obesity with, 509–511

Laparoscopic cholecystectomy, procedure-specific postoperative pain management guidelines for, 207–209

Laparoscopy, in obese patients, 484

Laparotomy models, for postoperative pain, 4–5

Lateral decubitus position, physiology of, 693–695

Legal issues, in pediatric palliative care, 849–851
advance care planning, 849–850
Baby Doe, 850
in adolescents, 851

Leptin, genetic variability in obesity and sleep apnea linked to, 451–453

Levobupivacaine, for postoperative pain in children, 177–178

Lingual muscles, physiotherapy of, for treatment of obstructive sleep apnea, 531

Liposomal drug delivery, for postoperative pain management, 75–76

Liposomes, hemoglobin-containing, 384

Local anesthetics, in postoperative pain management, 73–84

beneficial actions, 79–81

epidural, 130

combined with opioids, 130–131

in children, 176–178

bupivacaine, 176–177

newer agents, 177–178

long-lasting, 77–78

novel delivery techniques, 75–77

catheter techniques, 76–77

encapsulated drugs, 75–76

shift to outpatient surgery and, 74–75

toxicity issues, 78–79

unexpected toxicity, 73–74

pediatric acute pain management with, 798–799

volume and dosage in children, 827–828

Local infiltration, in children, 824

Lumbar anesthesia, in children, 824–827

Lumbar epidural analgesia, continuous, in children, 174

Lumbar plexus block, for postoperative pain, 146–148

Lung injury, acute, transfusion-related, 247

Lung transplantation, pediatric, 715–728
anesthesia management, 720–722

contraindications for, 718–719

history of, 715–716

immunosuppression and

surveillance, 723

indications for, 717–718

number of procedures, 716

post-transplant considerations and complications, 723–727

postoperative course and pain management, 722–723

procedure, 719–720

survival, 727–728

waiting list, 716–717

M

Magnesium, as analgesic adjunct in postoperative pain management, 89

Malabsorptive procedures, for surgical management of obesity, 514–516
 biliopancreatic diversion, 514–516
 duodenal switch, 514–516

Maleimide-activated polyethylene glycol-modified hemoglobin, 381–382

Malignancy, after pediatric lung transplantation, 726–727

Malignant hyperthermia, genetics of, 615–619

Mandibular repositioning devices, for treatment of obstructive sleep apnea, 526–527

Markers, genetic, for obstructive sleep apnea, 449

Mechanical ventilatory support, anesthesia ventilators, better options for children, 677–691
 in pediatric cardiac anesthesia, advances in, 666–667

Meperidine, pediatric acute pain management with, 795

Meridia. See *Sibutramine*.

Metabolic syndrome, obesity and, 423–425

Methadone, pediatric acute pain management with, 794

Minimally invasive techniques, for treatment of obstructive sleep apnea, 530–531
 genioglossus advancement, 530
 multilevel radiofrequency tissue ablation, 531
 tongue-base suspension, 531

Models, for postoperative pain, 2–15
 clinical, 2–4
 experimental *versus* clinical, 4
 laparotomy, 4–5
 plantar incision, 5–20

Monitoring, during anesthesia, intensity of, for obese patients, 483
 for patients with obstructive sleep apnea, children, 544–545
 neurological, in pediatric cardiac anesthesia, 662–666

Morbidly obese patients, intravenous patient-controlled analgesia in, 118

Morphine, in pediatric anesthesia, 626
 pediatric acute pain management with, 792–794

Multimodal analgesia, for postoperative pain management, postoperative and rehabilitation, 185–202
 analgesic options for, 186–193
 as part of preemptive analgesia techniques, 195–196

optimal techniques for, 193–195
 to shorten convalescence, 196

Muscle strengthening, for treatment of obstructive sleep apnea, 531

Music, in the preoperative period, impact on child's anxiety, 604–605

Myocardial ischemia; risk in patients with obstructive sleep apnea, preoperative evaluation of, 473–474

N

N-methyl-D-aspartate (NMDA) antagonists, as adjunct in postoperative pain management, 85–90
 amantadine, 90
 dextromethorphan, 88–89
 in multimodal approach, 192
 ketamine, 86–88
 magnesium, 89

Nalbuphine, pediatric acute pain management with, 796

Naloxone, pediatric acute pain management with, 797

Nano-dimension artificial red blood cells, 384

Nasal surgery, for treatment of obstructive sleep apnea, 529

Near-infrared spectroscopy, in pediatric cardiac anesthesia, 664

Neonates. See also *Infants*.
 sensitivity to opioids, 624–625

Neostigmine, as adjunct for postoperative pain in children, 180
 as analgesic adjunct in postoperative pain management, 96–98
 added to intravenous regional anesthesia, 98
 epidural, 97
 intra-articular, 97
 intrathecal, 96–97
 with local anesthetic for brachial plexus block, 97–98

Nerve blocks, paravertebral. See *Paravertebral nerve blocks*.

peripheral. See *Peripheral nerve blocks*.

Neuraxial opioids, as adjunct for postoperative pain in children, 179

Neurological monitoring, in pediatric cardiac anesthesia, 662–666

Neuromotor factors, obstructive sleep apnea in children related to, 537

Nitric oxide, in derivatives of acetaminophen and NSAIDs, 191

Nonsteroidal anti-inflammatory drugs (NSAIDs), as adjuvants to intravenous patient-controlled analgesia, 112–113 for postoperative pain in children, 166–167 in multimodal approach to postoperative pain management, 188–189 nitric oxide-releasing derivatives of, 191 pediatric acute pain management with, 791–792

Normovolemic hemodilution. See *Acute normovolemic hemodilution*.

Nurses, role in acute pain service, specialist pain nurses, 220–221 upgrading role of ward nurses in, 217–218

O

Obesity, anesthetic management of patients with, 479–486 intensity of monitoring required for, 483 laparoscopy in, 484 minimizing hypoxia during anesthesia, 484–486 pharmacokinetics, 479–481 positioning obese patients for surgery, 481–482 regional anesthesia in, 482–483 biology and genetics of, 445–461 definitions and demographics, 397–403 ethnic and racial differences, 398, 401 health costs associated with, 401–402 in childhood, 398–399 role of genetics in, 399–400 socioeconomic factors, 401 worldwide prevalence of, 397–398 in children, obstructive sleep apnea and, 536–537 morbid, intravenous patient-controlled analgesia in patients with, 118 pathophysiologic changes of, 421–429 cancer, 427 cardiovascular, 422 metabolic syndrome, 423–425 respiratory, 425–427 pediatric, anesthesia for, 745–764 intraoperative, 758–759 perioperative outcomes, 760–761 positioning, 759–760 preoperative, 757–758 bariatric surgery in adolescents, 756–757 causes, 750–751 definitions, 746 pathophysiology related to, 751–754 cardiovascular, 753–754 endocrinology, 754 respiratory, 752–753 pharmacology related to, 754–756 prevalence, 746–750 postoperative considerations for patients with sleep apnea and, 493–500 preoperative evaluation of patients with, 463–478 airway assessment, 465–466 cardiovascular system assessment, 468–469 other considerations, 469–470 respiratory function assessment, 466–467 rapid sequence induction in patients with, 551–564 cricoid pressure, 556–560 induction agent pharmacology, 560–561 risk of gastroesophageal reflux and pulmonary aspiration, 555–556 with the difficult airway, 552–555 risk factor for obstructive sleep apnea, 411–412 sleep apnea due to. See *Obstructive sleep apnea*. surgical and nonsurgical management of, 501–523 bariatric surgery, 504–520 choice of surgery, 518–519 complications, 517–518 future developments, 517 malabsorptive procedures, 514–516 overview of surgical procedures, 506–508 preoperative preparation, 505 restrictive procedures, 508–514 nonsurgical, 502–504 behavioral modification, 502 diet, 502 exercise, 502 weight loss drugs, 502–504

Obstructive sleep apnea, 397–564 anesthetic management of patients with, 486–491 effects of anesthetic drugs on ventilation responses in, 486–487

intensity of intraoperative monitoring required, 487
rational approach to, 488
technique, 487

biology and genetics of obesity and, 445–461
definitions, thresholds, and methodology, 446–447
familial relationships in, 447–449
mechanisms linking genetic variability in, 451–453
obesity and, 449–451
other inherited phenotypes predisposing to, 453–457
abnormalities in sleep regulation, 456–457
alterations in ventilation control, 455–456
craniofacial morphology, 453–455
specific genes and genetic markers associated with, 449

demographics and diagnosis of, 405–420
disease definition and diagnosis, 406–408
population prevalence, 408–410
risk factors for, 410–415
age, 412–413
alcohol consumption, 414–415
craniofacial abnormalities, 414
family history, 414
gender, 412
obesity, 411–412
race, 413
terminology, 406–407

in children, 535–549
clinical features, 537–538
complications, 538
evaluation, 539
pathophysiology, 535–537
airway anatomy, 536
neuromotor factors, 537
obesity and, 536–537
treatment, 539–547
intraoperative anesthesia plan, 542–544
monitoring, 544–545
pain management, 546
perioperative management, 540
postoperative care, 544
preanesthesia evaluation, 540–542
prognosis, 546–547
respiratory support, 545–546
surgery for, 540

intravenous patient-controlled analgesia in patients with, 117–118

obesity and. See also *Obesity*
biology and genetics of, 445–461
definitions and demographics, 397–403
pathophysiologic changes of, 421–429

pathophysiology of, 431–443
categories of, 431–433
causes, 434–435
contributing factors, 435–436
diseases associated with, 438–440
congestive heart failure, 440
coronary artery disease, 439
diabetes, 438–439
gastroesophageal reflux disease, 440
hypertension, 438
obesity, 438
stroke, 439
symptoms, 436–437

postoperative considerations for patients with, 493–500
additional considerations for obese patients, 498
disposition from postanesthesia care unit, 496–497
during recovery and immediate postoperative period, 495–496
pain management, 497–498

preoperative evaluation of patients with, 463–478
assessment of patients with known, 472–473
cardiovascular consequences of, 473–474
identifying patients with, 470–472
rapid sequence induction in patients with, 551–564
cricoid pressure, 556–560
induction agent pharmacology, 560–561
risk of gastroesophageal reflux and pulmonary aspiration, 555–556
with the difficult airway, 552–555

treatment for, 525–534
minimally invasive techniques, 530–531
genioglossus advancement, 530
multilevel radiofrequency tissue ablation, 531
tongue-base suspension, 531

nonsurgical, 525–527
adjustable oral appliances, 526–527
continuous positive airway pressure, 525–526
weight loss and behavioral therapies, 527

- surgical, 527–532
 - jaw advancement techniques, 530
 - nasal surgery, 529
 - perioperative issues for, 531–532
 - physiotherapy of lingual and supra-hyoid muscles, 531
 - tonsillectomy, 528–529
 - tracheostomy, 529–530
 - uvulopharyngopalatoplasty, 527–528
- Opioid antagonists, as analgesic adjuncts in postoperative pain management, 95–96
- Opioids, efficacy of epidural analgesia with, 129–130
 - for postoperative pain in children, 168–176
 - epidural/caudal blocks, 170–176
 - patient-controlled, 175–176
 - intravenous patient/parent/nurse-controlled analgesia with, 168–170
 - in acute pediatric pain management, 792–797
 - centroneuraxis opioids, 808
 - continuous intravenous infusion, 803
 - in multimodal approach to postoperative pain management, 186–187
 - in pediatric anesthesia, 621–634
 - developmental pharmacology, 622–625
 - drugs commonly used in, 626–632
 - epidural, 828–830
 - for procedural sedation, 648
 - in postoperative care of chronic opioid-consuming patients, 37–48
 - defining threshold for respiratory depression, 41–42
 - intravenous patient-controlled analgesia with an opioid, 40–41, 117
 - practical considerations for, 44–45
 - predicting settings for, 42–43
 - transition to oral opioids, 46
 - preoperative fentanyl challenge, 41
 - preoperative plan for, 38–39
 - regional analgesia techniques and nonopioid analgesics, 39–40
 - epidural analgesia and peripheral nerve blocks, 39
 - nonopioid analgesics, 39–40
 - tolerance, 38
 - neuraxial, as adjunct for postoperative pain in children, 179
- Oral analgesics, transition to, for pediatric acute pain management, 806–807
- Oral appliances, for treatment of obstructive sleep apnea, 526–527
- Organ transplant surgery, pediatric solid organ transplant, anesthesia considerations for, 709–731
 - heart transplantation, 709–715
 - lung transplantation, 715–728
- Orlistat, in management of obesity, 503–504
- Orthopedic elective surgery, perioperative assessment of patients, 295–303
 - preoperative evaluation and methods to reduce blood use in, 305–313
- Outcomes, clinical, of surgical patients requiring transfusion, anemia and, 315–325
 - in cardiac surgery, 327–345
- Outpatient surgery, shift to, and role of local anesthetics, 74–75
- Oxycodone, pediatric acute pain management with, 796
- Oxygen carriers, artificial. See *Artificial oxygen carriers*.

P

- Pain management, in pediatric palliative care, 844–849
 - in single-lung ventilation for pediatric anesthesia, 705
- opioids in pediatric anesthesia, 621–634
 - pediatric acute, 789–814
 - caudal analgesia, 807
 - centroneuraxis opioid, 808
 - continuous epidural analgesia, 803–805
 - cutaneous intravenous opioid infusion, 803
 - developmental neurobiology, 790
 - developmental pharmacology, 790–791
 - developmentally appropriate pain assessment, 800–801
 - drugs for, 791–800
 - nonpharmacologic methods, 809
 - patient-controlled analgesia, 801–803
 - epidural, 805–806
 - peripheral nerve blocks, 808–809
 - postoperative strategies, 801
 - regional techniques, 807
 - transition to oral analgesics, 806–807

postoperative, 1-225
 acute pain service for, 211-225
 audits and continuous quality improvement of, 221
 cost-effectiveness of, 215-216
 impact on outcome, 215
 implementation of, 216-221
 prevalence of, 212-213
 structure and function of, 213-214

analgesic adjuncts in, 85-107
 alpha-2 agonists, 90-93
 dexmedetomidine, 91, 94
 neuraxial clonidine, 91
 peripheral nerve blocks with clonidine, 91
 systemic clonidine, 90-91

anticonvulsants, 94-95
 corticosteroids, 98
 N-methyl-D-aspartate (NMDA) antagonists, 85-90
 amantadine, 90
 dextromethorphan, 88-89
 ketamine, 86-88
 magnesium, 89
 neostigmine, 96-98
 opioid antagonists, 95-96

cyclooxygenase-2 inhibitors in, 49-72
 contraindications, 63-64
 drug interactions, 63
 efficacy, 51-57
 celecoxib, 53-54
 parecoxib, 56-57
 valdecoxib, 55-56

expression and function, 50-51
 safety and tolerability, 57-63
 cardiorenal effects, 57-61
 effects on bone and wound healing, 62-63
 gastrointestinal toxicity, 57
 hematologic effects, 57-58
 hepatic effects, 61-62

epidural analgesia for, 125-140
 benefits and patient outcomes, 126-128
 factors affecting efficacy of, 129-132
 risks of, 132-134

for patients with obstructive sleep apnea, 497-498
 children, 546
 in children, 163-184
 epidural/caudal blocks, 170-175
 intravenous patient/parent/nurse-controlled analgesia, 168-170
 local anesthetics/adjuncts, 176-180
 nonopioid analgesics, 165-168
 potent opioid analgesics, 168

in chronic opioid-consuming patients, 37-48
 defining threshold for respiratory depression, 41-42

intravenous patient-controlled analgesia with opioid, 40-41
 practical considerations for, 44-45
 predicting settings for, 42-43
 transition to oral opioids, 46

opioid tolerance, 38
 preoperative fentanyl challenge, 41

preoperative plan for, 38-39

regional analgesia techniques and nonopioid analgesics, 39-40
 epidural analgesia and peripheral nerve blocks, 39
 nonopioid analgesics, 39-40

inadequate, consequences of, 21-36
 for recovery and health care use, 24-25

persistent postoperative pain, 25-31
 definition, 25
 incidence, 25-26
 mechanisms involved in, 28-29
 predictors of, 26-28
 prevention of, 29-31

physiologic, 21-23
 psychologic and behavioral, 23-24

incisional pain, mechanisms of, 1-20
 clinical models of, 2-4
 experimental versus clinical models of, 4

laparotomy models for, 4–5
plantar incision model for, 5–15

intravenous patient-controlled analgesia, 109–123

local anesthetics, clinical pharmacology of, 73–84
beneficial actions, 79–81
long-lasting, 77–78
novel delivery techniques, 75–77
catheter techniques, 76–77
encapsulated drugs, 75–76

shift to outpatient surgery and, 74–75

toxicity issues, 78–79

unexpected toxicity, 73–74

multimodal analgesic techniques and rehabilitation, 185–202
analgesic options for, 186–193
as part of preemptive analgesia techniques, 195–196
optimal techniques for, 193–195
to shorten convalescence, 196

peripheral nerve blocks and continuous catheter techniques, 141–162
brachial plexus blocks, 141–146
axillary, 145–146
infraclavicular, 144–145
interscalene, 141–143
supraclavicular, 143–144
femoral plexus block, 148–150
lumbar plexus block, 146–148
paravertebral nerve block, 153–154
popliteal fossa sciatic nerve block, 151–153
sciatic nerve block, 150–151

procedure-specific, 203–210
example of, for laparoscopic cholecystectomy, 207–209
initiatives to provide guidelines for, 205–209
reasons for, 204–205

Pain scales, for children, 164

Pain scores, defining maximum acceptable in acute pain service, 219

Pain, postoperative, incisional, mechanisms of, 1–20
clinical models of, 2–4
experimental *versus* clinical models of, 4
laparotomy models for, 4–5
plantar incision model for, 5–15
prevention strategies, 15–16
schematic for, 16–17

persistent, as consequence of inadequate pain relief, 25–31
definition, 25
incidence, 25–26
mechanisms involved in, 28–29
predictors of, 26–28
prevention of, 29–31

Palliative care, in pediatrics, 837–856
barriers to access to, 851–853
epidemiology of life-threatening illnesses, 837–839
ethics and decision making, 849–851
advance care planning, 849–850
Baby Doe, 850
in adolescents, 851
pain and symptom management, 844–849
psychological and spiritual concerns, 839–844

Paravertebral nerve blocks, for postoperative pain management, 153–154
in multimodal approach to, 187–188

Parecoxib, efficacy in postoperative pain management, 56–57

Parents, of pediatric patients, preoperative preparation programs for, 600
presence during induction of anesthesia, impact on child's anxiety, 601–604

Parvovirus infection, transfusion-transmitted, 245

Pathophysiology, in obesity, 421–429
cancer, 427
cardiovascular, 422
metabolic syndrome, 423–425
respiratory, 425–427
of obstructive sleep apnea, 431–443, 494–495
categories of, 431–433
causes, 434–435
contributing factors, 435–436
diseases associated with, 438–440
in children, 535–537
symptoms, 436–437

Patient-controlled analgesia, intravenous, **109–123**
 adjuvant drugs and, **112–114**
 added to the IV-PCA solution, **113–114**
 administered separately, **112–113**
 choices of opioids for, **111–112**
 efficacy of, **109–111**
 epidural, in children, **175–176**
 in children, **168–170**
 epidural, **175–176**
 in specific patient populations, **117–119**
 elderly patients, **118–119**
 morbidly obese patients, **117–118**
 opioid-tolerant patients, **117**
 sleep apnea patients, **117–118**
 opioid-related side effects, **112**
 patient factors, **116–117**
 patient education, **116–117**
 psychological characteristics, **116**
 pediatric acute pain management with, **801–803**
 epidural, **805–806**
 program parameters for, **114–116**
 bolus dose, **114–115**
 concurrent background (continuous) infusions, **115–116**
 dose limits, **116**
 lockout interval, **115**
 with opioids, in chronic opioid-consuming patients, **40–46**
 defining threshold for respiratory depression, **41–42**
 practical considerations for, **44–45**
 predicting settings for, **42–44**
 preoperative fentanyl challenge, **41**
 transition to oral opioids, **46**

Pediatric anesthesia, **573–861**
 acute pain management, **789–814**
 blood conservation in, **347–361**
 acute normovolemic hemodilution, **350–353**
 deliberate hypotension, **354**
 human recombinant erythropoietin, **354**
 preoperative administration of, **354–356**
 intraoperative blood salvage, **353**
 multimodal strategies for, **356–357**
 preoperative autologous donation, **349–350**
 transfusion triggers and institutional algorithms, **348–349**
 cardiac, new developments in, **655–676**
 for children with cerebral palsy, **733–743**
 for obese children, **745–764**
 for spinal fusion, **765–787**
 for thoracic solid organ transplant, **709–731**

future of, **857–861**
 genetics of malignant hyperthermia, **615–619**
 historical perspective, **573–595**
 opioids in, **621–634**
 palliative care and, **837–856**
 preoperative psychological preparation for surgery, **597–614**
 procedural sedation in, **635–654**
 regional, **815–835**
 single-lung ventilation in, **693–708**
 ventilators for, **677–691**

Pediatrics, obstructive sleep apnea in children, **535–549**
 clinical features, **537–538**
 complications, **538**
 evaluation, **539**
 pathophysiology, **535–537**
 airway anatomy, **536**
 neuromotor factors, **537**
 obesity and, **536–537**
 treatment, **539–547**
 intraoperative anesthesia plan, **542–544**
 monitoring, **544–545**
 pain management, **546**
 perioperative management, **540**
 postoperative care, **544**
 preanesthesia evaluation, **540–542**
 prognosis, **546–547**
 respiratory support, **545–546**
 surgery for, **540**

postoperative pain management in children, **163–184**
 epidural/caudal blocks, **170–175**
 intravenous patient/parent/nurse-controlled analgesia, **168–170**
 local anesthetics/adjuncts, **176–180**
 nonopioid analgesics, **165–168**
 potent opioid analgesics, **168**

Penile nerve block, in children, **818–819**

Perflubron emulsion (Oxygent), **382–384**

Perfluorocarbon (PFC) emulsions, as artificial oxygen carriers, **382–384**

Perioperative assessment, of elective orthopedic surgery patient, **295–303**

Perioperative care, for surgical treatment of obstructive sleep apnea, **531–532**
 in children, **540**

Peripheral nerve blocks, for pediatric acute pain management, **808–809**
 for postoperative pain, **141–162**
 brachial plexus blocks, **141–146**
 axillary, **145–146**
 infraclavicular, **144–145**

- interscalene, 141–143
- suprACLavicular, 143–144
- femoral plexus block, 148–150
- in chronic opioid-consuming patients, 39
- lumbar plexus block, 146–148
- paravertebral nerve block, 153–154
- popliteal fossa sciatic nerve block, 151–153
- sciatic nerve block, 150–151
- in multimodal approach to postoperative pain management, 187–188
- Persistent postoperative pain.** See *Pain, postoperative, persistent.*
- Pharmacokinetics, anesthetic management in obese patients.** 479–481
- Pharmacology, developmental, and opioids in pediatric anesthesia.** 622–625
 - in obese children and adolescents, 754–756
 - of agents for procedural sedation in pediatric patients, 644–650
 - of induction agents, and rapid sequence induction in patients with obesity and/or obstructive sleep apnea, 560–561
 - of pain behaviors after plantar incision, 8–9
 - spinal and parenteral, of incisional pain, 12–15
- Pharmacotherapy, in management of obesity.** 502–504
- Phen-fen.** 503
- Phentermine.** 503
- Phlebotomy, aggressive, in autologous blood donation.** 266–267
- Physiologic consequences, of inadequate postoperative pain relief.** 21–23
- Physiotherapy, of lingual and supra-hyoid muscles, for treatment of obstructive sleep apnea.** 531
- Plantar incision model, for postoperative pain.** 5–15
 - dorsal horn neuron sensitization, 12
 - nonevoked pain, 5–7
 - primary afferent fiber sensitization, 10–12
 - primary mechanical hyperalgesia, 7, 10
 - spinal and parenteral pharmacology of, 12–15
- Polymerized hemoglobin-based oxygen carrier, bovine.** 378–379
- human.** 379–380
- Polysomnography, in diagnosis of obstructive sleep apnea.** 406–408
 - in children, 539
- Popliteal fossa sciatic nerve block, for postoperative pain.** 151–153
- Positioning, for surgery, obese patients.** 481–482
- Post-transplant lymphoproliferative disorder, after pediatric lung transplantation.** 726–727
- Postanesthesia care unit (PACU), management of patients with obstructive sleep apnea in.** 495–497
 - disposition from, 496–497
 - during initial recovery, 495–496
- Postoperative management, of patients with obstructive sleep apnea.** 493–500
 - additional considerations for obese patients, 498
 - children, 544
 - disposition from postanesthesia care unit, 496–497
 - during recovery and immediate postoperative period, 495–496
 - pain management, 497–498
- Postoperative pain, models of, clinical.** 2–4
 - experimental *versus* clinical, 4
 - laparotomy, 4–5
 - plantar incision, 5–15
- persistent, as consequence of inadequate pain relief.** 25–31
 - definition, 25
 - incidence, 25–26
 - mechanisms involved in, 28–29
 - predictors of, 26–28
 - prevention of, 29–31
- Postoperative pain management.**
 - See Pain management.*
- Preemptive analgesia, multimodal analgesia as part of.** 195–196
- Pregabalin, in multimodal approach to postoperative pain management.** 193
- Preoperative autologous blood donation.** 263–270
 - aggressive phlebotomy in, 266–267
 - cost effectiveness, 268
 - erythropoietin use in, 266–267
 - for elective orthopedic surgery, perioperative assessment of patient, 295–303
 - preoperative evaluation and methods to reduce blood use, 305–313

in pediatric patients, 349–350
patient selection for, 264–266
preoperative collection of components, 267–268
transfusion trigger in, 267

Preoperative evaluation, and methods to reduce blood use in orthopedic surgery, 305–313

of patients with obesity, 463–469
airway assessment, 465–466
cardiovascular system assessment, 468–469
other considerations, 469–470
respiratory function assessment, 466–467

of patients with obstructive sleep apnea, 470–474
assessment of patient with, 472–473
cardiovascular assessment, 473–474
identifying patients with, 470–472
in children, 540–542

Preoperative preparation, psychological, of child for surgery, 597–614

risk factors for preoperative anxiety, 598–599
treatment of preoperative anxiety, 599–606
acupuncture, 605–606
behavioral intervention, 606
music, 604–605
outcomes of, 606–609
parental presence during induction of anesthesia, 601–604
preoperative preparation programs, 599–601

Prescription errors, in transfusion medicine, 256

Pressure controlled ventilation, in pediatric anesthesia, 685–687

Pressure support ventilation, in pediatric anesthesia, 688

Prevalence, of obstructive sleep apnea, 408–410

Procedural sedation, in pediatric patients, 635–654

Procedure-specific postoperative pain management, 203–210

example of, for laparoscopic cholecystectomy, 207–209

initiatives to provide guidelines for, 205–209

reasons for, 204–205

Prognosis, of children with obstructive sleep apnea, 546–547

Propofol, for procedural sedation in pediatric patients, 648–649

Protein binding, developmental pharmacology and opioids in pediatric anesthesia, 622–625

Psychologic consequences, of inadequate postoperative pain relief, 23–24

Psychological preparation, preoperative, of child for surgery, 597–614

risk factors for preoperative anxiety, 598–599

treatment of preoperative anxiety, 599–606

acupuncture, 605–606
behavioral intervention, 606
music, 604–605
outcomes of, 606–609
parental presence during induction of anesthesia, 601–604
preoperative preparation programs, 599–601

Pulmonary aspiration, risk of, in anesthesia of patients with obesity and/or obstructive sleep apnea, 555–556

Pulmonary circulation, modulation of, in single-lung ventilation for pediatric anesthesia, 705

Pulmonary hypertension, in patients with obstructive sleep apnea, preoperative evaluation of, 473

R

Race, as risk factor for obstructive sleep apnea, 413

Racial differences, in obesity, 398, 401

Radiofrequency tissue ablation, multilevel, for treatment of obstructive sleep apnea, 531

Rapid sequence induction, in patients with obesity and/or obstructive sleep apnea, 551–564

cricoid pressure, 556–560
induction agent pharmacology, 560–561
risk of gastroesophageal reflux and pulmonary aspiration, 555–556
with the difficult airway, 552–555

Recombinant factor VIIa, in pediatric cardiac anesthesia, 660–661

Recombinant human erythropoietin, blood conservation with, in cardiac surgery, 339–340
in elective orthopedic surgery, 309–311
in pediatric surgical patients, 354–356

Recovery, of red blood cells. *See Cell salvage.*

Red blood cell recovery and reinfusion. *See Cell salvage.*

Regional analgesia, for postoperative pain in chronic opioid-consuming patients, 39

Regional anesthesia, in children, 815–835
 axillary block/brachial plexus blocks, 822–824
 caudal and lumbar, 824–827
 epidural opiates, 828–830
 fascia iliaca compartment block, 821
 femoral nerve block, 819–821
 ilioinguinal-iliohypogastric nerve block, 816–818
 local infiltration and “splash” local anesthesia, 824
 penile nerve block, 818–819
 sciatic nerve blockade, 821–822
 spinal, for infants, 830–832
 volume and dosage of local, 827–828
 in obese patients, 482–483

Regional techniques, for pediatric acute pain management, 807

Rehabilitation, postoperative, multimodal analgesia to shorten, 196

Reinfusion, of recovered red blood cells. *See Cell salvage.*

Rejection, after pediatric solid organ transplantation, heart, 715
 lung, 724

Remifentanil, in pediatric anesthesia, 628–629
 new developments in pediatric cardiac anesthesia, 656–657

Renal drug clearance, developmental pharmacology and opioids in pediatric anesthesia, 622–625

Reservoir, collection, in red cell recovery and reinfusion, 287–288

Respiratory depression, predicting threshold for, with postoperative opioids in chronic opioid-consuming patients, 41–42

Respiratory function, preoperative assessment in obese patients, 466–467

Respiratory pathophysiology, in obesity, 425–427

Respiratory support, after surgery in children with obstructive sleep apnea, 545–546

Risk factors, for obesity, 397–403
 for obstructive sleep apnea, 410–415
 age, 412–413
 alcohol consumption, 414–415
 craniofacial abnormalities, 414
 family history, 414
 gender, 412
 obesity, 411–412
 race, 413

Ropivacaine, for postoperative pain in children, 177–178

Roux-en-Y gastric bypass, surgical management of obesity with, 511–514
 complications following, 513
 essential components of, 512

S

Salvage. *See Cell salvage.*

Sampling, pretransfusion, errors in, 256–257

Sciatic nerve block, for postoperative pain, 150–151

Sciatic nerve blockade, in children, 821–822

Sedation, procedural, in pediatric patients, 635–654
 controversial issues in, 650–651
 documentation, 642
 equipment for, 639–641
 goals of, 636
 levels of, 636–637
 monitoring, 641–642
 patient selection, 638–639
 pharmacology of, 644–650
 presedation planning and consent, 639
 recovery and discharge, 642–644
 skills and training of personnel for, 637–638

Sensitization, dorsal horn neuron, 12
 hyperalgesia and, 2
 primary afferent fiber, 10–12

Serious Hazards of Transfusion (SHOT) scheme, 254–255

Silbutramine, in management of obesity, 503–504

Single-lung ventilation, in pediatric anesthesia for thoracic surgery, 693–708
 avoiding airway injury during, 704
 modulation of pulmonary circulation, 705–706
 monitoring and anesthetic techniques, 704–705

pain management techniques, 705
 physiology of, 695–696
 lateral decubitus position, 693–695
 surgical lesions of chest, 696
 techniques, 697–703
 Arndt endobronchial
 blockers, 698–700
 balloon-tipped bronchial
 blockers, 697
 double-lumen tubes, 701–703
 Fogarty embolectomy
 catheters, 697–698
 in patients who have a
 tracheostomy, 703
 single-lumen endotracheal
 tube, 697
 Univent tubes, 700–701
 treating and avoiding hypoxemia
 during, 703–704
 video-assisted thoracoscopic
 surgery, 705

Sleep apnea. *See* *Obstructive sleep apnea*.

Sleep regulation, abnormalities in, inherited, predisposing to sleep apnea, 456–457

Sleep study. *See* *Polysomnography*.

Socioeconomic factors, role in obesity, 401

Sodium bicarbonate, as adjunct for postoperative pain in children, 179

Solid organ transplant surgery, pediatric, anesthesia considerations for, 709–731
 heart transplantation, 709–715
 lung transplantation, 715–728

Spinal anesthesia, for infants, 830–832
 anatomy, 830–831
 drug dosage in, 832
 technique in ex-premature
 patients, 831

Spinal fusion, pediatric, anesthetic management for, 765–787
 anesthesia, 774–781
 clinical synthesis, 780–781
 inhaled anesthetics, 775–776
 intravenous anesthetics, 776–779
 nonanesthetic intraoperative
 influences, 779
 evoked potentials, 767–774
 need for intraoperative neurologic
 monitoring, 766–767
 preoperative evaluation, 765–766

Spiritual care, as part of pediatric palliative care, 842

Splash local anesthesia, in children, 824

Sponges, surgical, rinsing of, in red cell recovery and reinfusion, 286–287

Staff support, in pediatric palliative care, 843–844

Stress response, new developments in pediatric cardiac anesthesia, 656

Stroke, associated with obstructive sleep apnea, 439

Sufentanil, in pediatric anesthesia, 627–628

Supra-hyoid muscles, physiotherapy of, for treatment of obstructive sleep apnea, 531

Supravacuicular brachial plexus block, for postoperative pain, 143–144

Surgeons, role in acute pain service, 219

Surgery, for children who have cerebral palsy, 733–743
 for obstructive sleep apnea, 527–532
 jaw advancement techniques, 530
 nasal surgery, 529
 perioperative issues for, 531–532
 physiotherapy of lingual and supra-hyoid muscles, 531
 tonsillectomy, 528–529
 tracheostomy, 529–530
 uvulopharyngopalatoplasty, 527–528
 for weight loss. *See* *Bariatric surgery*.
 positioning, with obese patients, 481–482
 preoperative psychological preparation of child for, 597–614
 thoracic, single-lung ventilation for
 children undergoing, 693–708

Synchronized intermittent mandatory ventilation, in pediatric anesthesia, 687

T

Thoracic epidural analgesia, continuous, in children, 174–175

Thoracic surgery, pediatric solid organ transplant, anesthesia considerations for, 709–731
 heart transplantation, 709–715
 lung transplantation, 715–728
 physiology of lateral decubitus position, 693–695
 single-lung ventilation in pediatric anesthesia for, 693–708
 surgical lesions of chest, 696
 video-assisted, 705

Tissue ablation, multilevel radiofrequency, for treatment of obstructive sleep apnea, 531

Tolerance, opioid, 38, 117

Tongue-base suspension, for treatment of obstructive sleep apnea, 531

Tonsillectomy, for treatment of obstructive sleep apnea, 528–529
in children, for obstructive sleep apnea treatment, 539–540

Toxicity, of local anesthetics in postoperative pain management, 78–79

Tracheostomy, for treatment of obstructive sleep apnea, 529–530
single-lung ventilation for pediatric anesthesia in child with, 703

Tramadol, as adjunct for postoperative pain in children, 180
for postoperative pain in children, 167–168
pediatric acute pain management with, 797

Transcranial Doppler, in pediatric cardiac anesthesia, 663–664

Transfusion medicine, 241–389
acute normovolemic hemodilution, 271–281
benefits of, 277
cost effectiveness of, 278
efficacy of, 277–278
future of, 278
in pediatric patients, 350–353
physiologic consequences, 273–274
practical considerations for, 275–277
technique, 271–273
anemia and, in surgical patients, 315–325
efficacy of transfusion, 319–322
human data, 318–319
interaction between pathophysiological processes and, 317–318
pathophysiology, 315–317
transfusion threshold, 322–323
artificial oxygen carriers, 373–389
autologous blood donation, 263–270
aggressive phlebotomy in, 266–267
cost effectiveness, 268
erythropoietin use in, 266–267
patient selection for, 264–266
preoperative collection of components, 267–268
transfusion trigger in, 267
blood conservation, in critically ill patients, 363–372
in elective orthopedic surgery, 305–313
in pediatric anesthesia, 347–361
cardiac surgery, conventional *versus* bloodless, 327–345
blood conservation methods in, 339–341
clinical outcomes, factors influencing, 334–339
coronary artery bypass graft techniques and, 330
laboratory coagulation tests, 330–331
predictors of transfusion requirements for, 332–334
variability in transfusion practice for, 331–332
errors in, 247–248, 253–261
prevention of, 258–259
types of, 255–258
UK Serious Hazards of Transfusion (SHOT) scheme, 254–255
in critically ill patients, 363–372
in elective orthopedic surgery, perioperative patient assessment, 295–303
preoperative evaluation and reducing blood use in, 305–313
in pediatric patients, 347–361
red blood cell recovery and reinfusion, 283–294
comparison with other techniques, 290–292
cell salvage, 292
normovolemic hemodilution, 291–292
preoperative autologous donation, 291
complications, 290
air embolism, 290
wrong wash solution, 290
optimizing red cell return, 290
anticoagulant, 287
calculation of blood loss during cell salvage, 288
collection reservoir, 287–288
optimizing red cell return, 285–288
rinsing of surgical sponges, 286
suction, 285–286
wash quality, 289–290
physics of cell salvage machine, 283–285
risks of blood transfusion, 241–252
acute lung injury related to, 247
emerging risks, 248
errors in, 247–248, 253–261
immunosuppression, 246–247
infections, 241–246

Transfusion threshold, increased, to conserve blood, 340–341

Transfusion triggers, in autologous blood donation, 267
in pediatric anesthesia, 348

Transfusion-related acute lung injury, 247

Transplant surgery, pediatric solid organ transplant, anesthesia considerations for, 709–731
heart transplantation, 709–715
lung transplantation, 715–728

Trigger, transfusion, in autologous blood donation, 267
in pediatric anesthesia, 348

U

Univent tubes, for single-lung ventilation in pediatric anesthesia, 700–701

Upper airway resistance. See also *Obstructive sleep apnea*.
physiologic characteristics of, 431–433

Uvulopharyngopalatoplasty, for treatment of obstructive sleep apnea, 527–528

V

Valdecoxib, efficacy in postoperative pain management, 55–56

Vascular complications, after pediatric lung transplantation, 725

Ventilation control, alterations in, inherited, predisposing to sleep apnea, 455–456

Ventilatory support, mechanical, anesthesia ventilators, better options for children, 677–691
comparison studies, 688–690
conventional, 679–681
modern, 681–685
selecting the ventilation mode, 685–688
pressure controlled ventilation, 685–687

pressure support ventilation, 688

synchronized intermittent mandatory ventilation, 687

volume control ventilation, 685

in pediatric cardiac anesthesia, advances in, 666–667

single-lung ventilation in pediatric anesthesia for thoracic surgery, 693–708

Vertical banded gastroplasty, surgical management of obesity with, 508–509

Video-assisted thoracoscopic surgery, single-lung ventilation for pediatric anesthesia with, 705

Viral infections, due to blood transfusions, 242–243
West Nile virus, emerging risk of, 248

Volume control ventilation, in pediatric anesthesia, 685

W

Weight loss, for treatment of obstructive sleep apnea, 527

Weight loss drugs, in management of obesity, 502–504

Weight loss surgery. See *Bariatric surgery*.

West Nile virus, transfusion-associated, emerging risk of, 248

Wound healing, effects of cyclooxygenase-2 inhibitors for postoperative pain management, 61–62

X

Xenical. *See* Orlistat.